

**AMENDMENT**

**IN THE CLAIMS:**

Please amend the claims as follows:

1. (Canceled)

2. (Currently amended) A thermal processing unit ~~according to claim 1~~ comprising:

a heating-furnace body whose upper end has an opening,

a reaction tube consisting of a single tube contained in the heating-furnace body,

a gas-discharging-unit connecting portion formed at an upper portion of the reaction tube,

the gas-discharging-unit connecting portion having a narrow diameter,

a substrate-to-be-processed supporting member for supporting a substrate to be processed,  
contained in the heating-furnace body, and

a heating unit for heating the substrate to be processed supported by the substrate-to-be-  
processed supporting member,

wherein the heating unit has:

a first heating portion arranged around the reaction tube,

a second heating portion arranged around the gas-discharging-unit connecting portion,

a third heating portion arranged around an upper portion of the reaction tube,

a fourth heating portion arranged around a lower portion of the reaction tube, and

a fifth heating portion arranged under the substrate-to-be-processed supporting member,

wherein

the first heating portion is formed by a plurality of linear heat-generating members, which are arranged in parallel with a longitudinal direction of the reaction tube.

3. (Currently amended) A thermal processing unit ~~according to claim 1~~ comprising:

- a heating-furnace body whose upper end has an opening,
- a reaction tube consisting of a single tube contained in the heating-furnace body,
- a gas-discharging-unit connecting portion formed at an upper portion of the reaction tube,
- the gas-discharging-unit connecting portion having a narrow diameter,
- a substrate-to-be-processed supporting member for supporting a substrate to be processed,
- contained in the heating-furnace body, and
- a heating unit for heating the substrate to be processed supported by the substrate-to-be-processed supporting member,
- wherein the heating unit has:
  - a first heating portion arranged around the reaction tube,
  - a second heating portion arranged around the gas-discharging-unit connecting portion,
  - a third heating portion arranged around an upper portion of the reaction tube,
  - a fourth heating portion arranged around a lower portion of the reaction tube, and
  - a fifth heating portion arranged under the substrate-to-be-processed supporting member,

wherein

the first heating portion is formed by a plurality of U-shaped heat-generating members, which are arranged in parallel with a longitudinal direction of the reaction tube.

4. (Currently amended) A thermal processing unit ~~according to claim 1~~ comprising:

- a heating-furnace body whose upper end has an opening,
- a reaction tube consisting of a single tube contained in the heating-furnace body,
- a gas-discharging-unit connecting portion formed at an upper portion of the reaction tube,
- the gas-discharging-unit connecting portion having a narrow diameter,
- a substrate-to-be-processed supporting member for supporting a substrate to be processed,
- contained in the heating-furnace body, and

a heating unit for heating the substrate to be processed supported by the substrate-to-be-processed supporting member,

wherein the heating unit has:

a first heating portion arranged around the reaction tube,

a second heating portion arranged around the gas-discharging-unit connecting portion,

a third heating portion arranged around an upper portion of the reaction tube,

a fourth heating portion arranged around a lower portion of the reaction tube, and

a fifth heating portion arranged under the substrate-to-be-processed supporting member,

wherein

the second heating portion is formed by a linear heat-generating member, which is arranged in a spiral pattern.

5. (Currently amended) A thermal processing unit ~~according to claim 1~~ comprising:

a heating-furnace body whose upper end has an opening,

a reaction tube consisting of a single tube contained in the heating-furnace body,

a gas-discharging-unit connecting portion formed at an upper portion of the reaction tube,

the gas-discharging-unit connecting portion having a narrow diameter,

a substrate-to-be-processed supporting member for supporting a substrate to be processed, contained in the heating-furnace body, and

a heating unit for heating the substrate to be processed supported by the substrate-to-be-processed supporting member,

wherein the heating unit has:

a first heating portion arranged around the reaction tube,

a second heating portion arranged around the gas-discharging-unit connecting portion,

a third heating portion arranged around an upper portion of the reaction tube,

a fourth heating portion arranged around a lower portion of the reaction tube, and

a fifth heating portion arranged under the substrate-to-be-processed supporting member,  
wherein

the third heating portion is formed by a linear heat-generating member, which is arranged in a spiral pattern.

6. (Currently amended) A thermal processing unit ~~according to claim 1~~ comprising:

a heating-furnace body whose upper end has an opening,  
a reaction tube consisting of a single tube contained in the heating-furnace body,  
a gas-discharging-unit connecting portion formed at an upper portion of the reaction tube,  
the gas-discharging-unit connecting portion having a narrow diameter,  
a substrate-to-be-processed supporting member for supporting a substrate to be processed,  
contained in the heating-furnace body, and  
a heating unit for heating the substrate to be processed supported by the substrate-to-be-processed supporting member,

wherein the heating unit has:  
a first heating portion arranged around the reaction tube,  
a second heating portion arranged around the gas-discharging-unit connecting portion,  
a third heating portion arranged around an upper portion of the reaction tube,  
a fourth heating portion arranged around a lower portion of the reaction tube, and  
a fifth heating portion arranged under the substrate-to-be-processed supporting member,  
wherein

the third heating portion is formed by a linear heat-generating member, which is arranged in a switchback pattern.

7. (Currently amended) A thermal processing unit ~~according to claim 1~~ comprising:

a heating-furnace body whose upper end has an opening,  
a reaction tube consisting of a single tube contained in the heating-furnace body,

a gas-discharging-unit connecting portion formed at an upper portion of the reaction tube,  
the gas-discharging-unit connecting portion having a narrow diameter,

a substrate-to-be-processed supporting member for supporting a substrate to be processed,  
contained in the heating-furnace body, and

a heating unit for heating the substrate to be processed supported by the substrate-to-be-  
processed supporting member,

wherein the heating unit has:

a first heating portion arranged around the reaction tube,

a second heating portion arranged around the gas-discharging-unit connecting portion,

a third heating portion arranged around an upper portion of the reaction tube,

a fourth heating portion arranged around a lower portion of the reaction tube, and

a fifth heating portion arranged under the substrate-to-be-processed supporting member,

wherein

the fourth heating portion is formed by a linear heat-generating member, which is arranged in a spiral pattern that is seen as rectangular in a circumferential direction of the reaction tube.

8. (Currently amended) A thermal processing unit ~~according to claim 1~~ comprising:

a heating-furnace body whose upper end has an opening,

a reaction tube consisting of a single tube contained in the heating-furnace body,

a gas-discharging-unit connecting portion formed at an upper portion of the reaction tube,  
the gas-discharging-unit connecting portion having a narrow diameter,

a substrate-to-be-processed supporting member for supporting a substrate to be processed,  
contained in the heating-furnace body, and

a heating unit for heating the substrate to be processed supported by the substrate-to-be-  
processed supporting member,

wherein the heating unit has:

a first heating portion arranged around the reaction tube,

a second heating portion arranged around the gas-discharging-unit connecting portion,

a third heating portion arranged around an upper portion of the reaction tube,

a fourth heating portion arranged around a lower portion of the reaction tube, and

a fifth heating portion arranged under the substrate-to-be-processed supporting member,

wherein

the fourth heating portion is formed by a linear heat-generating member, which is arranged in a switchback pattern.

9. (Currently amended) A thermal processing unit ~~according to claim 1~~ comprising:

a heating-furnace body whose upper end has an opening,

a reaction tube consisting of a single tube contained in the heating-furnace body,

a gas-discharging-unit connecting portion formed at an upper portion of the reaction tube,

the gas-discharging-unit connecting portion having a narrow diameter,

a substrate-to-be-processed supporting member for supporting a substrate to be processed,  
contained in the heating-furnace body, and

a heating unit for heating the substrate to be processed supported by the substrate-to-be-processed supporting member,

wherein the heating unit has:

a first heating portion arranged around the reaction tube,

a second heating portion arranged around the gas-discharging-unit connecting portion,

a third heating portion arranged around an upper portion of the reaction tube,

a fourth heating portion arranged around a lower portion of the reaction tube, and

a fifth heating portion arranged under the substrate-to-be-processed supporting member,

wherein

the fifth heating portion is formed by a plate-like heat-generating member.

10. (Canceled)

11. (Previously presented) A thermal processing unit according to claim 2, wherein  
the linear heat-generating member is formed by sealing a resistance heater into a hollow  
tubular member made of ceramics.

12. (Original) A thermal processing unit according to claim 9, wherein  
the plate-like heat-generating member is formed by sealing a resistance heater into a  
hollow plate-like member made of ceramics.

13. (Previously presented) A thermal processing unit according to claim 11, wherein  
the ceramics is quartz.

14. (Currently amended) A thermal processing unit ~~according to claim 1~~ comprising:  
a heating-furnace body whose upper end has an opening,  
a reaction tube consisting of a single tube contained in the heating-furnace body,  
a gas-discharging-unit connecting portion formed at an upper portion of the reaction tube,  
the gas-discharging-unit connecting portion having a narrow diameter,  
a substrate-to-be-processed supporting member for supporting a substrate to be processed,  
contained in the heating-furnace body, and  
a heating unit for heating the substrate to be processed supported by the substrate-to-be-  
processed supporting member,  
wherein the heating unit has:  
a first heating portion arranged around the reaction tube,  
a second heating portion arranged around the gas-discharging-unit connecting portion,  
a third heating portion arranged around an upper portion of the reaction tube,

a fourth heating portion arranged around a lower portion of the reaction tube, and  
a fifth heating portion arranged under the substrate-to-be-processed supporting member,

wherein

the second heating portion is supported in a movable manner in a horizontal direction.

15-26. (Canceled)

27. (Previously Presented) A thermal processing unit comprising:

- a heating-furnace body whose upper end has an opening,
- a reaction tube consisting of a single tube contained in the heating-furnace body,
- a gas-discharging-unit connecting portion formed at an upper portion of the reaction tube,

the gas-discharging-unit connecting portion having a narrow diameter,

- a substrate-to-be-processed supporting member for supporting a substrate to be processed,

contained in the heating-furnace body,

- a heating unit for heating the substrate to be processed supported by the substrate-to-be-processed supporting member,
- a reaction-tube lower lid that seals a lower portion of the reaction tube and holds airtightness in the reaction tube, and
- a temperature measuring unit formed by sealing a plurality of temperature measuring members into a hollow tubular member,

wherein the hollow tubular member is arranged in a gap between the heating-furnace body and the reaction tube.

28. (Canceled)

29. (Original) A thermal processing unit comprising:

- a heating-furnace body whose upper end has an opening,



a reaction tube consisting of a single tube contained in the heating-furnace body,  
a gas-discharging-unit connecting portion formed at an upper portion of the reaction tube,  
the gas-discharging-unit connecting portion having a narrow diameter,  
a substrate-to-be-processed supporting member for supporting a substrate to be processed,  
contained in the heating-furnace body,  
a heating unit for heating the substrate to be processed supported by the substrate-to-be-processed supporting member,  
a reaction-tube lower lid that seals a lower portion of the reaction tube and holds airtightness in the reaction tube,  
a second temperature measuring unit formed by sealing a plurality of temperature measuring members into a second hollow tubular member, and  
a third temperature measuring unit formed by sealing a plurality of temperature measuring members into a third hollow tubular member,  
wherein at least a portion of the second hollow tubular member extends horizontally from an upper portion of the reaction tube, and  
at least a portion of the third hollow tubular member is arranged in a gap between the heating-furnace body and the reaction tube.

30. (Canceled)

31. (Original) A thermal processing unit comprising:

a heating-furnace body whose upper end has an opening,  
a reaction tube consisting of a single tube contained in the heating-furnace body,  
a gas-discharging-unit connecting portion formed at an upper portion of the reaction tube,  
the gas-discharging-unit connecting portion having a narrow diameter,  
a substrate-to-be-processed supporting member for supporting a substrate to be processed,  
contained in the heating-furnace body,

a heating unit for heating the substrate to be processed supported by the substrate-to-be-processed supporting member,

a reaction-tube lower lid that seals a lower portion of the reaction tube and holds airtightness in the reaction tube,

a second temperature measuring unit formed by sealing a plurality of temperature measuring members into a second hollow tubular member, and

a third temperature measuring unit formed by sealing a plurality of temperature measuring members into a third hollow tubular member,

wherein the heating unit has:

a first heating portion arranged around the reaction tube,

a second heating portion arranged around the gas-discharging-unit connecting portion,

a third heating portion arranged around an upper portion of the reaction tube,

a fourth heating portion arranged around a lower portion of the reaction tube, and

a fifth heating portion arranged under the substrate-to-be-processed supporting member,

at least a portion of the second hollow tubular member extends horizontally from an upper portion of the reaction tube, and

at least a portion of the third hollow tubular member is arranged in a gap between the heating-furnace body and the reaction tube.

32. (Canceled)

33. (Previously presented) A thermal processing unit according to claim 31, wherein

a temperature controlling unit is provided around the gas-discharging-unit connecting portion.

34. (Original) A thermal processing unit according to claim 33, wherein  
the temperature controlling unit is a heat-insulating material.
35. (Original) A thermal processing unit according to claim 33, wherein  
the temperature controlling unit is a resistance heater.
36. (Previously presented) A thermal processing unit according to claim 35, wherein  
the temperature controlling unit has flexibility.
37. (Previously presented) A thermal processing unit according to claim 35, wherein  
the temperature controlling unit is shaped in advance.
38. (Previously presented) A thermal processing unit according to claim 31, wherein  
the gas-discharging unit is a gas-discharging pipe whose end portion has a flange,  
a flange is formed at an end portion of the gas-discharging-unit connecting portion, and  
the flange at the end portion of the gas-discharging-unit connecting portion and the flange  
at the end portion of the gas-discharging pipe are hermetically connected to each other by means  
of a sealing unit.
39. (Original) A thermal processing unit according to claim 38, wherein  
the temperature controlling unit has a fluid hole provided in the flange.